

Validation of the Physical Activity Questionnaire for Older Children

**Kent C. Kowalski, Peter R.E. Crocker,
and Robert A. Faulkner**

Two studies assessed the validity of the Physical Activity Questionnaire for Older Children (PAQ-C), a 7-day recall that assesses general moderate to vigorous physical activity levels during the school year. The first study, involving 89 elementary school students in Grades 4-8, investigated convergent, divergent, and construct validity. The PAQ-C was moderately related to an activity rating ($r = .63$), week summation of 24-hr moderate to vigorous activity recalls ($r = .53$), a teacher's rating of physical activity ($r = .45$), and perceptions of athletic competence ($r = .48$). As expected, the PAQ-C was not related to perceptions of behavioral conduct. The second study, involving 97 elementary school students, investigated convergent and construct validity. The PAQ-C was moderately related to an activity rating ($r = .57$), the Leisure Time Exercise Questionnaire ($r = .41$), a Caltrac motion sensor ($r = .39$), a 7-day physical activity recall interview ($r = .46$), and a step test of fitness ($r = .28$). The PAQ-C validity coefficients were as high as or greater than the 7-day recall interview. These two studies support the validity of the PAQ-C as a method of assessing older children's general physical activity levels.

An important challenge in determining the relationship between health and physical activity is valid assessment. Many measures that exist do not have sound psychometric characteristics for accurate assessment in children (19), and the techniques that are most valid are often not practical. Self-report may be the most practical method of assessing large-scale populations, but no standard measure exists (19). Few studies even document the reliability and validity of children's self-reports of physical activity (17). Improving physical activity assessment in children is a first step in assessing the relationship between activity and health, as well as the determinants of childhood physical activity and changes in activity levels (12).

The lack of a "gold standard" for measuring physical activity poses a problem in testing for concurrent and construct validity because the validity coefficient is limited by the reliability of the criterion measure (8). Convergence of test scores may be more appropriate to assess validity. A number of proposed convergent

The authors are with the College of Physical Education at the University of Saskatchewan, 105 Gymnasium Place, Saskatoon, SK Canada S7N 0W0.

relationships with other physical activity measures can be used with children. These methods include motion sensors (12, 14, 17), 7-day self-reports of activity (6, 10), activity rating (21), 7-day recall interview (17, 18, 20), and teacher assessment (24).

Construct validity evidence can be established by testing how well a physical activity measure is correlated with related constructs (27), such as cardiovascular health, muscular-skeletal health, participation in organized sport and games, and perceptions of athletic competence. These interrelationships have been found in empirical research or are theoretically proposed.

Small sample sizes make it difficult or inappropriate to examine gender differences on physical activity measures (18). As a result, gender differences on most physical activity measures have often not been tested. Most findings have shown males to have higher activity levels across various age groups of youth (1, 9, 13, 22), although there are exceptions (15, 25).

The Physical Activity Questionnaire for Older Children (PAQ-C)

The Physical Activity Questionnaire for Older Children (PAQ-C) was developed to assess levels of moderate to vigorous physical activity in children beyond Grade 3 (6). The PAQ-C was designed to be relatively quick to complete (<20 min), to be inexpensive, to have low staff burden (self-administered), and to be easy to understand (developmentally appropriate). It is a self-administered 7-day recall questionnaire. Nine items, each scored on a 5-point scale, are used to derive a total activity score. One-week test-retest reliability of the PAQ-C was found to be $r = .75$ for males and $r = .82$ for females from Grades 4 to 8 (6). The PAQ-C, however, lacks important validation evidence.

The purpose of this project was to assess the convergent and construct validity of the PAQ-C. It was expected that the PAQ-C would be a valid measure to assess levels of moderate to vigorous physical activity in children from Grades 4 through 8. Validity of the PAQ-C was to be established through the following: (a) significant relationships between the PAQ-C and other measures of physical activity, (b) positive relationships between the PAQ-C and theoretically related constructs, (c) no relationship between the PAQ-C and behavioral conduct, (d) acceptable item distribution, and (e) the sensitivity to detect gender differences in physical activity levels.

A number of logistical issues were taken into account to validate the PAQ-C. It was important to consider the response burden on the subjects, data contamination (e.g., children playing with devices), disruption of classes, financial cost, and carryover effects. For example, completing one physical activity measurement may bias the child's response on another activity instrument. Therefore, rather than design studies to assess convergent and construct validity separately, two studies combined different measures based on the logistical issues of time, expense, and carryover.

Study 1

The first study examined the convergent and construct validity of the PAQ-C. The hypotheses of the first study were that the PAQ-C would be positively related to an activity rating (21), teacher's rating of physical activity (PA2; 24), and a daily

checklist of physical activity (MVPA; 25) consisting of total moderate to vigorous physical activity (TMVPA) and longer-than-10-min moderate to vigorous physical activity (LMVPA). It was also expected that the PAQ-C would be moderately correlated with a measure of athletic competence (11) and would not be related to behavioral conduct (11). Gender differences were also examined.

Participants

Children between Grades 4 and 8 were recruited from a school in the Saskatoon Public School System. All students and parents/guardians provided informed consent. Data from students who were identified by teachers as having reading problems, or who reported on the PAQ-C that sickness or other events prevented them from doing regular activity, were excluded from the study. The final sample consisted of 89 students (38 male, 51 female), ranging in age from 8 to 13 years ($M = 11.06$, $SD = 1.46$).

Measures

The Physical Activity Questionnaire for Older Children (PAQ-C). The PAQ-C was developed to assess levels of moderate to vigorous physical activity in children from Grade 4 upward (6). Physical activity was described as "sports, games, or dance that make you breathe hard, make your legs feel tired, or make you sweat." Nine statements on the PAQ-C are used in the calculation of a summary total activity score. Each of the nine items is converted to a 5-point scale, with higher scores indicating higher levels of activity. The PAQ-C composite is calculated as the mean of the nine items, and can range from 1 to 5. The first question is an activity checklist consisting of common sports, leisure activities and games, plus room for other activities.

Six questions assess activity in physical education classes, recess, lunch, right after school, in the evenings, and on the weekend. One question asks which statement "describes you best for the last 7 days," with five statements describing low activity to very high activity levels. One question asks the child to indicate how often he or she did physical activity for each day of the week. Of the two other items, one pertains to determining if sicknesses or other events prevented the child from doing her or his regular activity, and was used as a basis for deleting a child's data from further analysis. The other item asks the child to recall the number of hours he or she watched television. Neither of these latter two items is used in the calculation of the PAQ-C score. The PAQ-C has favorable reliability (6). A sample of 84 children from Grades 4–8 completed the PAQ-C one week apart in the spring. Test-retest using intraclass correlation was $r = .75$ for males and $r = .82$ for females.

Behavioral Conduct. The behavioral conduct scale from Harter's (11) self-perception profile for children manual taps the degree to which children like the way they behave, do the right thing, and act the way they are supposed to. Harter (11) reported that for four samples of third- to eighth-grade children, the internal consistency ranged from $\alpha = .71$ to $\alpha = .77$. This scale had insignificant to low correlations (.01 to .28) with athletic competence (11), indicating that it is an appropriate scale to use for divergent validity.

Athletic Competence. The athletic competence scale (11) taps children's perception relevant to sport and games. Scale reliability over four samples of Grades 3 to 8 children ranged from $\alpha = .80$ to $\alpha = .86$. Research using an earlier version of

the scale found participation in organized sport was related to perceptions of athletic competence (16).

Activity Rating. The rating of activity levels consists of one question: "Compared to others of your age and sex, how much physical activity do you get?" (21). It is rated on a 5-point scale ranging from *much less active* to *much more active*. The activity index demonstrated test-retest reliability of .93 for fifth graders and .85 for eighth graders over a 2-week period (18).

Teacher's Rating (PA2). Physical activity has been assessed by asking the teacher to rate each child's degree of physical activity during selected school activities (24). The teacher's questionnaire consists of eight items each on a 5-point scale. Saris et al. (24) found that the teacher's rating was positively related to physical performance capacity in 8- to 12-year-old children.

Moderate to Vigorous Physical Activity (MVPA). The MVPA consists of 10 activity categories (running, fast walking, games and sport, bicycling, warm-up exercises, dancing, exercise stations, skipping, and swimming) and an "other" space (25). Two scores can be obtained that represent the amount of activity per day; the TMVPA and LMVPA. Baranowski et al. (5) reported a 76% agreement rate between children's recall of MVPA and observations of activities over a full day. Simons-Morton et al. (25) found that the percentage of agreement was higher (86%) when relating LMVPA and observation from a fixed location (physical education classes).

Procedure

The children were assessed during October in a time period selected which avoided any special school events (play days, professional development days). The week of physical activity assessment by the MVPA followed the week recalled by the PAQ-C due to the possibility of carryover effects. Five classrooms were assessed during one day. The children were given instructions on how to complete the MVPA, with each student completing a recall based on the previous day as practice. The other questionnaires were completed in the following order: behavioral conduct, athletic competence, PAQ-C, and activity rating. A research assistant gave verbal instructions and was available to answer questions. For the younger classes, the questionnaires were explained with the aid of an overhead projector. The teachers were asked to identify students who potentially had reading difficulty. At this time, teachers completed the teacher's rating (PA2).

The students completed the MVPA each day for 7 days. Students were phoned each evening as a reminder to complete the MVPA. In order for a student's MVPA data to be used, it had to have been completed for at least 5 of the 7 days, including at least one weekend day. The return rate of the MVPA forms was 80.9%. Students who failed to return the MVPA did not significantly differ in age, grade, or sex from the students who had returned the forms.

Results and Discussion

Descriptive statistics for the four physical activity measures including the PAQ-C, activity rating, PA2, and the two scores of the MVPA, as well as the behavioral conduct and athletic competence scales, are shown in Table 1. All measures had scores that were approximately normally distributed.

Table 1 Descriptives for the Measures in Study 1

Variable	<i>n</i>	<i>M</i>	<i>SD</i>
PAQ-C	84	3.23	0.78
Activity rating	89	3.62	1.02
PA2	88	68.13	10.97
TMVPA	72	3.99	1.25
LMVPA	72	2.31	1.20
Behavioral conduct	88	2.92	0.53
Athletic competence	88	2.94	0.58

Note. PAQ-C = Physical Activity Questionnaire for Older Children; PA2 = teacher's rating of children's physical activity; TMVPA = total moderate to vigorous physical activity; LMVPA = longer-than-10-min moderate to vigorous physical activity.

Table 2 Zero-Order Correlations Among Measures in Study 1

Variable	1	2	3	4	5	6	7
1. PAQ-C	—						
2. Activity rating	.63* (84)	—					
3. PA2	.45* (83)	.51* (88)	—				
4. TMVPA	.53* (70)	.35* (72)	.28* (71)	—			
5. LMVPA	.41* (70)	.27* (72)	.30* (71)	.68* (72)	—		
6. Behavioral conduct	.16 (83)	.15 (88)	-.15 (87)	.29* (72)	.21* (72)	—	
7. Athletic competence	.48* (83)	.60* (88)	.37* (87)	.24* (71)	.14 (71)	.09 (87)	—

Note. PAQ-C = Physical Activity Questionnaire for Older Children; PA2 = teacher's rating of children's physical activity; TMVPA = total moderate to vigorous physical activity; LMVPA = longer-than-10-min moderate to vigorous physical activity.

* $p < .05$ (one-tail significance).

The correlations among measures support the hypotheses that the PAQ-C would be moderately related to the other measures of physical activity (activity rating, PA2, MVPA), and provided convergent validity evidence for the PAQ-C (Table 2). Construct validity of the PAQ-C was supported by assessing its relationship with Harter's (11) athletic competence and behavioral conduct scales. As expected, a moderate positive relationship was found between the PAQ-C and ath-

letic competence (Table 2). The results of this study supported the expected relationship between children's physical activity and perceptions of athletic competence. No relationship was found between the PAQ-C and the measure of behavioral conduct supporting the divergent validity of the PAQ-C (Table 2).

Significant gender differences emerged for only the PAQ-C, $t(82) = 2.47, p < .05$, and the teacher's rating, $t(86) = 4.30, p < .05$. No gender difference was expected or found on the activity rating because the students were asked to compare their physical activity to others of their age and sex. There was no gender difference on either of the MVPA scores. A limitation of the MVPA is that it had low correlations with the activity rating and teacher's rating, and there was no divergent validity with behavioral conduct.

Study 2

The purpose of Study 2 was to examine the relationship between the PAQ-C and other measures of physical activity and a children's test of aerobic fitness. The activity measures included free recall questionnaires (activity rating [21] and Leisure Time Exercise Questionnaire [10]), a 7-day recall interview (PAR; 20), and an electronic motion sensor (Caltrac). The general measure of fitness used was the step test (2). The hypotheses of the second study were that the PAQ-C would be moderately related to all measures of physical activity and to the children's step test of fitness. Gender differences were also examined.

Participants

Children between the fourth and eighth grade were recruited from a school in the Saskatoon Public School System and were from a different school than those in the first study. All students and parents/guardians provided informed consent. Data from students identified by their teachers as having reading problems, or who reported on the PAQ-C that sickness or other events prevented them from doing regular activity, were excluded from the study. The final sample consisted of 97 students (41 males, 56 females), ranging in age from 9 to 14 years ($M = 11.30, SD = 1.39$).

Measures

Seven-Day Recall Interview (PAR). The 7-day physical activity recall (PAR) is a standardized interview that assists subjects in recalling light, moderate, hard, and very hard activity (20). Summary variables can include any combination of activities as well as an index of caloric expenditure. The physical activity recall interview kilocalorie expenditure index used with children showed significant test-retest correlations for fifth graders ($r = .47$) and eighth graders ($r = .59$) (18). Sallis et al. (18) have demonstrated validity for the PAR by comparing very hard recalls with heart rates on the same day. Validity coefficients were .29 for fifth-grade children and .45 for eighth-grade children. The PAR was also found to be significantly correlated with Caltrac activity counts with children for each of 2 days ($r = .49$ on Day 1 and $r = .39$ on Day 2) (17). Ten interviewers received training on the PAR procedures. The PAR training manual was obtained, and the training protocol was followed.

Caltrac Motion Sensor. The Caltrac (Muscle Dynamics, Torrance, CA) is an electronic, single-plane accelerometer designed to accumulate counts that reflect total vertical acceleration of the body. The Caltrac has provided satisfactory

psychometric values when used as an activity counter in children. Interinstrument reliability for the Caltrac was $r = .96$ in the field and $r = .89$ in the laboratory for children from 8 to 13 years of age (17). Significant correlations were found between the Caltrac and the PAR ($r = .49$ on Day 1 and $r = .39$ on Day 2) and between the Caltrac and heart rate monitoring ($r = .54$ on Day 1 and $r = .42$ on Day 2) for children from 8 to 13 years of age (17).

Leisure Time Exercise Questionnaire. The Godin and Shephard (10) Leisure Time Exercise Questionnaire assesses the frequency of strenuous, moderate, and mild exercise over an average 7-day period to form a total exercise score (Godin 1). A second question on the Leisure Time Exercise Questionnaire (Godin 2), measured on a 3-point scale (ranging from *often* to *never/rarely*), asks how often during a week does the individual engage in sweat-inducing regular activity. The total exercise score was found to have a 2-week test-retest reliability of $r = .69$ and $r = .80$ for Grades 5 and 8 students (18), and $r = .84$ for junior high school students (9). For children and adolescents, the total exercise score has been shown to be related to the PAR interview ($r = .57$ for Grade 5; $r = .60$ for Grade 8) and an activity rating ($r = .52$ for Grade 5; $n.s.$ for Grade 8) (18).

Canadian Home Fitness Test (Step Test). The Canadian Home Fitness Test (CHFT; 2) requires the participants to step at an age- and sex-specific rhythm controlled by recorded music. The heart rates from the step test were used to classify children into seven general fitness categories ranging from *needs activity* to *super fit*. Validation of the test for children ranging from 11 to 14 years indicated that the test discriminated between children's physical activity patterns as classified by a teacher's rating of their sport activity involvement (2). The CHFT was used to provide construct validity evidence for the PAQ-C because physical fitness and physical activity levels are thought to be related (4).

PAQ-C. This was the same as in Study 1.

Activity Rating. This was the same as in Study 1.

Procedures

The children were assessed over an 8-week period during April–May. The time period selected for each group of students contained a 2-week span which avoided any special school events that may have caused children to change normal activities. Each child was assessed on 2 separate days, 7 days apart. Due to the possibility of carryover effects, scores from the interview and Caltrac were obtained from a different 7-day period than the PAQ-C, activity rating, Leisure Time Exercise Questionnaire, and the step test.

The PAQ-C was administered in class, followed by the activity rating and the Leisure Time Exercise Questionnaire. A research assistant gave verbal instructions and was available to answer questions. After completing the Leisure Time Exercise Questionnaire, the students completed the Canadian Home Fitness Test (CHFT) in groups of six to eight. Heart rates during the CHFT were monitored using heart rate monitors. Following the step test the children were given instructions on the use and care of the Caltrac. The Caltrac was set at standard values (weight = 100, height = 60, age = 10, sex = 0) before being put in a holster and taped shut to prevent tampering. The Caltrac was worn for 7 days, with a phone call each evening as a reminder. The Caltrac was recovered at the end of the 7-day period, and the activity per day (corrected for the number of days worn) was recorded. For the student's Caltrac data to be used, the student had to wear the monitor for at least 5 of the 7 days, including at

least 1 weekend day. A 5-day minimum was chosen to minimize loss of subjects as a result of students forgetting to wear the Caltrac for a short period of time, but still sufficient over which to estimate habitual activity.

Caltrac data was collected for 75.3% of students (9 students did not wear the Caltrac for at least 5 days, 8 tampered with the Caltrac, 4 were absent when the Caltrac data were recorded, 2 stopped because of a rash, and 1 student lost his Caltrac). The group with complete Caltrac data tended to be younger and in lower grades than the group that failed to have useable Caltrac data. After the Caltrac was collected, each child was interviewed using the 7-day recall.

Results and Discussion

Descriptive statistics for the five physical activity measures including the PAQ-C, activity rating, Caltrac, the two scores on the Leisure Time Exercise Questionnaire (Godin 1 and Godin 2), the PAR interview index of caloric expenditure, and the PAR interview hours spent in moderate, hard, and very hard activity, as well as the step test of fitness (CHFT), are shown in Table 3.

The correlations among measures support the hypotheses that the PAQ-C would be moderately related to the other measures of physical activity and fitness (Table 4). The significant but low correlation between the PAQ-C and the CHFT is consistent with previous research. Baranowski et al. (4) stated that physical activity is only weakly related to cardiovascular fitness among children. Most previous research looking at the relationship between physical activity and fitness in children has found correlations around $r = .20$ or lower. These low correlations have occurred consistently across methods, including questionnaires (10, 13), observation (26), and interview (21). These results may indicate that future research should expect only a weak relationship between physical activity and aerobic fitness in children.

The maximum physical activity score a child could have on the PAQ-C was 5, creating a ceiling for reported activity levels. If the purpose of a physical activity scale in a study is to look at group means, then the presence of unusually high individual scores may distort the group's true mean. A limitation with having a measure with a ceiling may be an inability to discriminate at the top end of the

Table 3 Descriptives for the Measures in Study 2

Variable	<i>n</i>	<i>M</i>	<i>SD</i>
PAQ-C	97	3.35	0.68
Activity rating	97	3.67	0.97
Godin 1	97	75.31	58.20
Godin 2	96	1.52	0.52
Caltrac	73	426.54	131.61
PAR	92	37.72	4.13
PAR hours	92	9.32	4.78
CHFT	92	4.09	1.68

Note. PAQ-C = Physical Activity Questionnaire for Older Children; PAR = 7-day physical activity recall; CHFT = Canadian Home Fitness Test (step test).

Table 4 Zero-Order Correlations Among Measures in Study 2

Variable	1	2	3	4	5	6	7	8
1. PAQ-C	—							
2. Activity rating	.57* (97)	—						
3. Godin 1	.41* (97)	.33* (97)	—					
4. Godin 2	-.57* (96)	-.64* (96)	-.27* (96)	—				
5. Caltrac	.39* (73)	.28* (73)	.24* (73)	-.21* (73)	—			
6. PAR	.46* (92)	.27* (92)	.27* (92)	-.32* (92)	.38* (72)	—		
7. PAR hours	.43* (92)	.26* (92)	.27* (92)	-.31* (92)	.30* (72)	.92* (92)	—	
8. CHFT	.28* (92)	.36* (92)	.22* (92)	-.24* (91)	.25* (70)	.16 (88)	.07 (88)	—

Note. Correlation matrix is based on pair-wise comparisons and the *n* values (in parentheses) may differ. Correlations between Godin 2 and other measures are Spearman coefficients. PAQ-C = Physical Activity Questionnaire for Older Children; PAR = 7-day physical activity recall; CHFT = Canadian Home Fitness Test (step test).

* $p < .05$ (one-tail significance).

scale, but this is not the purpose of the PAQ-C. The PAQ-C was developed to provide a general measure of physical activity that would differentiate between high and low active children, and the ceiling on the PAQ-C helps prevent influential outliers that can arise with open-ended scales such as the PAR interview and the Leisure Time Exercise Questionnaire.

The significant correlations between the PAQ-C and both PAR hard ($r = .31$, $p < .05$) and very hard activity ($r = .42$, $p < .05$) provided validity support for the PAQ-C because it asks children to recall activities that make them breathe hard or make them sweat. The PAR moderate activity index was not related to the PAQ-C, which was expected, given that moderate activity on the PAR was described as being similar to how children feel when they walk at their normal pace, and this type of activity was not included on the PAQ-C.

We used *t* tests to compare males and females on the physical activity measures. Contrary to expectations, males had higher activity than females on only the Caltrac, $t(71) = 2.91$, $p < .05$, and PAR, $t(90) = 2.06$, $p < .05$. There were no differences between males and females on any of the other measures of activity or fitness, including the PAQ-C.

General Discussion

The purpose of this research was to assess the construct, convergent, and divergent validity of the Physical Activity Questionnaire for Older Children. Convergent

validity evidence for the PAQ-C was demonstrated in two studies by significant relationships with other physical activity measures. The strongest evidence for the validity of the PAQ-C was that it was related not only to other physical activity recall questionnaires but to other methods as well. Construct validity of the PAQ-C was supported by its significant moderate relationship with a measure of perceptions of athletic competence (11) and the step test of fitness (CHFT; 2). The non-significant relationship with Harter's (11) behavioral conduct scale provided divergent validity support. This multiple measurement approach involving different assessment methods provides support for the PAQ-C as a measure of general physical activity levels in older children.

Other strengths of the PAQ-C also emerged from this research. In the two present studies, the PAQ-C had a scale distribution that was approximately normal. Also, the variances around the group means on the PAQ-C indicate a range of physical activity levels were being assessed. The normal distribution of PAQ-C scores remains as an attractive feature of the PAQ-C for group physical activity research in children.

Boys as a group were found to be more active than girls in the first study, but the lack of sex differences on the PAQ-C in the second study may have occurred because the sample seemed to be made up of children with higher physical activity levels than in prior research with the PAQ-C. Higher activity scores on the PAR and Godin scales were also apparent when compared with recent research (18). First, the time period tested in the second study was April–May, which may be a period during which children are more active. Higher values on the PAQ-C during this season are consistent with previous studies involving the PAQ-C (6). Second, only about two-thirds of potential students in the school volunteered to participate; thus, there may have been a tendency for more active children to participate in the study. Future research using the PAQ-C should examine whether it is sensitive enough to detect real group differences in physical activity levels if they exist.

At a practical level, the PAQ-C appeared to perform as well as, if not better than, other measures at converging with the other methods of assessing children's physical activity. The PAQ-C was also less expensive and time consuming than many of the other measures. Compliance with the test protocol was a problem encountered with the daily activity recall (MVPA) and Caltrac, for which there was incomplete data from approximately 20% of subjects, even though they received daily phone calls. Probably the simplest measure of physical activity was the one-item activity rating. Although the scale had good psychometric properties in both studies, it has limited use because subjects are comparing themselves to others of their age and sex. Also, as in previous research (18), the students tended to rate themselves as having activity levels equal to or higher than others of their same age and sex, with very few students choosing to rate themselves on the lower end of the scale. The PAR interview performed similarly to the PAQ-C. The PAR has an advantage in that it allows a breakdown of physical activity into intensity. Nevertheless, it can be costly and time consuming to train interviewers and to conduct the interviews. The low cost, ease of administration, and low subject burden make the PAQ-C attractive for large-scale studies involving general levels of physical activity in children.

A limitation of the PAQ-C is that it does not provide frequency, intensity, and time information about physical activity levels. The significant correlations between the PAQ-C and PAR hard and very hard activity levels suggest that the PAQ-C measures more vigorous types of activity. Baranowski (3) reports on the

difficulty of measuring specific activities and the lack of accuracy in recalling specific activities among children. Children's lack of accuracy in recalling specific durations of physical activities also occurred in a study of fifth-grade children by Sallis et al. (22), in which the children could not accurately recall minutes of activity as compared to heart rate monitors, despite a recall period of only one day. Thus, a limitation of using self-reports of physical activity may be having to live with measures that provide information regarding more general physical activity levels. Measures that attempt to provide more than just general physical activity levels for children need to demonstrate validity in providing frequency, intensity, and time information, and still be practical for large-scale studies.

Future research should further examine the construct validity of the PAQ-C. Stronger validity evidence for the PAQ-C would be established by looking at its relationship with other assessment techniques, such as doubly labeled water (see discussion in Davies [7] and Saris [23]) or the Tritrac motion sensor (14). Future research should be conducted with older age groups to examine the validity of the PAQ-C with students beyond Grade 8. The sensitivity of the PAQ-C in discriminating between group physical activity levels should be established, which would allow examination of the relationships between physical activity and other variables. A more complex issue concerns the use of item weighting on the PAQ-C. This may result in more accurate activity assessment, but this remains to be tested. A weighted item composite may be beneficial if children participate in more physical activity away from school, as has been suggested (25). The weighted item scoring may also more accurately reflect a student's activity level if he or she tends to be more active in the evenings or on weekends when the time period for potential physical activity is longer.

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